

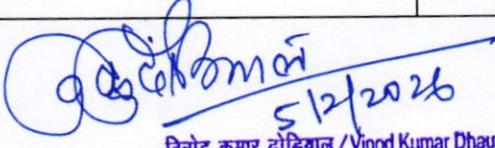
BEFORE NATIONAL GREEN TRIBUNAL PRINCIPAL BENCH, NEW DELHI

Original Application No. 538/2024

News item titled "Arsenic in Food: Should you wash rice before cooking it" appearing in Times Now dated 31.03.2024

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 5/2/2026
 विनोद कुमार दोडियाल / Vinod Kumar Dhaundiyal
 प्रशासक / Administrator
 केन्द्रीय भूमि जल प्राधिकरण / Central Ground Water Authority
 जल संसाधन, नदी विकास एवं गंगा संरक्षण
 Deptt. of Water Resources, River Development & Ganga Rejuvenation
 जल शक्ति मंत्रालय / Ministry of Jal Shakti
 भारत सरकार / Government of India

DELHI

Through

DATED

05/2/2026

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 (For Respondent No. 5/ Central Ground
 Water Authority)

BEFORE NATIONAL GREEN TRIBUNAL PRINCIPAL BENCH, NEW DELHI**Original Application No. 538/2024****News item titled "Arsenic in Food: Should you wash rice before cooking it" appearing in Times Now dated 31.03.2024****REPLY ON BEHALF OF CENTRAL GROUND WATER AUTHORITY/ RESPONDENT**
NO. 5**It is most respectfully showeth that:**

1. I Vinod Kumar Dhaundiyal, aged about 51, working as Administrator, Central Ground Water Authority, Govt. of India, Ministry of Jal Shakti, Water Resources, River Development and Ganga Rejuvenation, having office at 18/11 Jam Nagar House, New Delhi 110011, do hereby solemnly affirm and state on oath as under on behalf of Respondent No. 5 (CGWA) hereinafter referred to as Answering Respondent.
2. That I am in my aforementioned official capacity, well conversant with the facts and circumstances of the present case on the basis of the documents and records available in the department. As such, I am competent and authorized to swear this counter affidavit on behalf of answering respondent.
3. That, I have perused the contents of the above captioned Original Application and I am duly authorized to depose by way of the present affidavit.

BRIEF SUBMISSION

4. That the Hon'ble Tribunal registered this original application suo-moto on the basis of the news item titled "Arsenic in Food: Should you wash rice before cooking it" appearing in Times Now dated 31.03.2024.
5. That in the Original Application serious issue relating to presence of arsenic in rice which can be poisonous for human body was raised.
6. That the Hon'ble Tribunal vide para no 5 of order dated 14.08.2025 impleaded Central Ground Water Authority (CGWA) as an additional respondent in the matter. Para 5 of the order is reproduced hereunder :

"5. It has been pointed out that Central Ground Water Authority (CGWA) is the competent authority which can ensure measures to prevent high contents of arsenic rice in the affected areas. Hence, we implead the CGWA as respondent no.5 through its chairman".

7. That it is submitted that contamination of ground water by Arsenic in the country, is in general, geogenic in nature. Arsenic in ground water is naturally occurring from the breakdown of rocks and soils or weathering and deposition of atmospheric particles. Arsenic occurrence in natural water is affected by the type of rocks, climatic conditions, subsurface geochemical conditions, nature of hydrogeological strata and time of contact between rock and the circulating ground water.
8. That CGWB has identified scientifically proven mitigation and remedial measures for arsenic contamination, including identification of alternate safe aquifers, restriction on use of contaminated sources, blending of arsenic-free water, conjunctive use of surface and groundwater, artificial recharge, and adoption of standard arsenic removal technologies wherever alternate sources are not available.
9. That based on extensive hydrogeological studies, CGWB has developed innovative well construction and cement sealing techniques to tap arsenic-safe deeper aquifers while preventing inter-mixing with contaminated shallow aquifers.
10. That CGWB has been continuously undertaking groundwater exploration, monitoring and assessment of groundwater quality across the country and shares groundwater quality data with the concerned State Governments for taking appropriate remedial measures.
11. That it is submitted that so far, 522 exploratory wells tapping arsenic safe aquifers have been constructed under NAQUIM programme including 40 in Bihar, 188 in West Bengal and 294 in Uttar Pradesh with this technique. The innovative cement sealing technique of CGWB has been shared with the state agencies to utilize to construct arsenic free wells.
12. That accordingly, CGWA has prepared the present status report on the issue of the Arsenic Contamination in Ground Water and the works done by CGWB by taking remedial as well as preventive measures to mitigate the same. The Status report has been annexed as Annexure-1.

13. That the present reply and status report may kindly be taken on record and into consideration and the Hon'ble Tribunal may pass appropriate order(s), direction(s) as deemed fit and proper under the facts and circumstances of the present case.


5/2/2026

बिनोद कुमार दोडियाल / Vinod Kumar Dhaundiyal
प्रशासक / Administrator
केन्द्रीय भूमि जल प्राधिकरण / Central Ground Water Authority
जल संसाधन, नदी विकास एवं गंगा संरक्षण
Deptt of Water Resources, River Development & Ganga Rejuvenation
जल शक्ति मंत्रालय / Ministry of Jal Shakti
भारत सरकार / Government of India

Verification

Verified at New Delhi on 05/02/2026 that the contents of the above affidavit is true and correct to the best of my knowledge and belief, nothing material has been concealed there from.


5/2/26

बिनोद कुमार दोडियाल / Vinod Kumar Dhaundiyal
प्रशासक / Administrator
केन्द्रीय भूमि जल प्राधिकरण / Central Ground Water Authority
जल संसाधन, नदी विकास एवं गंगा संरक्षण
Deptt of Water Resources, River Development & Ganga Rejuvenation
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DELHI

Through

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**(For Respondent No. 5/ Central Ground
Water Authority)**

DATED

Annexure-1**Status of Arsenic Contamination in Groundwater and Mitigation Measures Including Remedial Actions and CGWB Initiatives for Construction of Arsenic Free Wells****Mitigation of Arsenic Contamination in Ground Water****1. Introduction**

The contamination of ground water by Arsenic in the country are in general geogenic in nature. Arsenic in ground water are naturally occurring from the breakdown of rocks and soils or weathering and deposition of atmospheric particles. Arsenic occurrence in natural water is affected by the type of rocks, climatic conditions, nature of hydrogeological strata, underground hydro chemical condition and time of contact between rock and the circulating ground water.

Arsenic is widely distributed in all geological materials at varying concentrations. On the basis of the arsenic geochemistry, the probable mechanisms of arsenic mobilization in groundwater is attributed to

- (i) Dissolution of As-rich iron oxyhydroxides (FeOOH) due to onset of reducing conditions in the subsurface
- (ii) Mobilization of As due to the oxidation of As-bearing pyrite minerals.
- (iii) Release of As sorbed to aquifer minerals by competitive exchange with phosphate ($H_2PO_4^-$) ions

Out of the above three, the first mechanism involving dissolution of FeOOH under reducing conditions is considered to be the most probable reason for excessive As accumulation in groundwater in large alluvial aquifers

The Arsenic contamination in Ganga-Bhagirathi alluvial tract covering parts of Uttar Pradesh, Bihar and West-Bengal are mostly confined to shallow aquifers. The excess arsenic may cause sufficient damage to human health like respiratory distress and cardiac diseases. Anaemia and leucopenia are other common effects of arsenic poisoning. The maximum permissible limit of Arsenic for drinking purpose is 0.01 mg/L (or 10 ppb) as per BIS (Bureau of Indian Standards) Drinking Water Standards (IS 10500:2012). The BIS permissible limit of Arsenic was revised from 0.05 mg/L (50 ppb) to 0.01 mg/L (10 ppb) in the year 2015.

2. Mitigation of Major Contamination

The following points are important while considering the mitigation of ground water contamination:

- Arsenic contamination are mostly geogenic in nature and less commonly due to anthropogenic causes involving human activities such as uses of fertilizers and pesticides and due to industrial pollution.
- In case of anthropogenic contamination, mitigation may be done through by adopting proper preventive measure.
- Geogenic contamination can not be undone as the contamination is in the aquifer which is the source of the ground water. However, it can be diluted through measures such as artificial recharge of aquifer. Conjunctive use of surface and ground water will also play an important role in ground water contaminated areas.
- When ground water sources are used for drinking and domestic purposes, it's always advisable to find alternate safe sources for supply in the ground water contaminated area. The level of Arsenic in drinking water can be reduced by blending with Arsenic free water.
- Identified contaminated sources or ground water utilization sources such as dug wells, bore wells, tube wells are to be marked and their utilization is to be prohibited and public should be made aware about these prohibited sources.
- There are standard scientifically proven techniques to remove the Arsenic from drinking water, which should only be used in case of no alternate source for ground water supply available.

2.1 Remedial Measures for Arsenic

(a) Precipitation processes: Adsorption, co-precipitation with hydrolysing metals such as Al^{3+} and Fe^{3+} is the most common treatment technique for removing arsenic from water. Sedimentation followed by rapid sand filtration or direct filtration or microfiltration is used to remove the precipitate. To improve efficiency of this method, a prior oxidation of As (III) to As (V) is advisable. Hypochlorite and permanganate are commonly used for the oxidation.

(b) **Adsorptive processes-** Adsorption on to activated alumina, activated carbon and iron/manganese oxide based or coated filter media. Adsorptive processes involve the passage of water through a contact bed where arsenic is removed by surface chemical reactions. The activated alumina-based sorptive media are being used in India. Granular ferric hydroxide is a highly effective adsorbent used for the adsorptive removal of arsenate, arsenite, from natural water.

(c) **Ion-exchange processes-** This is similar to that of activated alumina, however, in this method the medium is synthetic resin of relatively well-defined ion exchange capacity. In these processes, ions held electrostatically on the surface of a solid phase are exchanged for ions of similar charge dissolved in water. Usually, a synthetic anion exchange resin is used as a solid. Ion exchange removes only negatively charged As (V) species.

(d) **Membrane processes-** This includes nano-filtration, ultrafiltration, reverse osmosis and electrodialysis in which synthetic membranes are used for removal of many contaminants including arsenic. They remove arsenic through filtration, electric repulsion, and adsorption of arsenic-bearing compounds.

3. Work Done by CGWB towards Mitigation of Arsenic Contamination

Various steps have been taken by the Central Government for facilitating ground water quality improvement/ remediation of contamination in the country, as given below:

1. Central Ground Water Board is doing ground water exploration in the country since its establishment and has constructed large number of borewells and tubewells in all states, irrespective of the hydrogeological conditions. The water samples from each of these wells undergo chemical analysis and successful wells free from any contaminants were handed over to state ground water departments for their use for community drinking water supply.
2. Data on ground water quality available with CGWB along with information on ground water contamination are shared with concerned State Governments for taking necessary remedial measures.

3. Awareness generation programs/ workshop on various aspects of ground water including preventing ground water pollution and safe use of contaminated water are being conducted by CGWB periodically.
4. Based on the findings of the studies and experience of ground water exploration, CGWB has developed certain methods for constructing fluoride and arsenic free wells by employing suitable designing of wells and cement sealing techniques. Such techniques of construction of contaminant free bore wells/ tube wells are shared with the state ground water departments to use them in similar terrains.
5. Under the National Aquifer Mapping Programme (NAQUIM) of CGWB, special attention is being given to the aspect of ground water quality including contamination by toxic substances such as Arsenic in ground water.
6. CGWB in collaboration with NIH, Roorkee prepared a vision document on "Mitigation and Remedy of Ground water Arsenic Menace in India" in June 2010 which is available for online access at:

<https://cgwb.gov.in/cgwbpnm/public/uploads/documents/17050521771636797339file.pdf>

Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti has issued guidelines for control and regulation of groundwater extraction with pan-India applicability notified on 24 September 2020. The guidelines include clauses on 'Measures to be adopted to ensure prevention from pollution in the plant premises of polluting industries/projects'. It is pointed out that ground water in and around polluting industries like Tannery, Slaughter Houses, Dye, Chemical, Coal-washery, other hazardous units, etc. and is generally observed to be polluted. In order to prevent further deterioration of ground water quality in such places, it is essential to take necessary measures for well head protection, such as Tube well/ bore well to be constructed at the place which is hygienically maintained, RCC (Reinforced Concrete Cement) grouting around tubewell, no recharge measures within the plant premises etc.

2.3.1 Well Construction for Tapping Arsenic safe Alternate Aquifer

This technique advocates tapping of safe alternate aquifers right within the affected areas. In India, generally, the vast As affected areas in the Gangetic Plains covering Bihar and Uttar

Pradesh as well as Deltaic Plains in West Bengal are marked by multi aquifer systems. All the arsenic affected districts in UP and in Bihar are aligned along the linear track of the river Ganga, so is the position in West Bengal where it is along the eastern side of river Bhagirathi. The sedimentary sequence is made up Quaternary deposits, where the aquifers made up of unconsolidated sands which are separated by clay/sandy clay, making the deeper aquifer/aquifers semi-confined to confined. The contamination is confined to the upper slice of the sediments, within the depth of 80 m and affecting the shallow aquifer system. At places, like Maldah district of West Bengal, single aquifer exists till the bed rock encountered at 70-120 m bgl.

It has been observed that shallow aquifers are having more arsenic contaminations in comparison to the deep aquifers. Therefore, deep wells were constructed to tap deeper zones of arsenic free ground water. In the multi aquifer system the cement sealing technique was adopted to prevent the mixing of arsenic contaminated water with arsenic free ground water. The design of construction of Arsenic free Tube well with cement sealing technology is shown at Fig.1

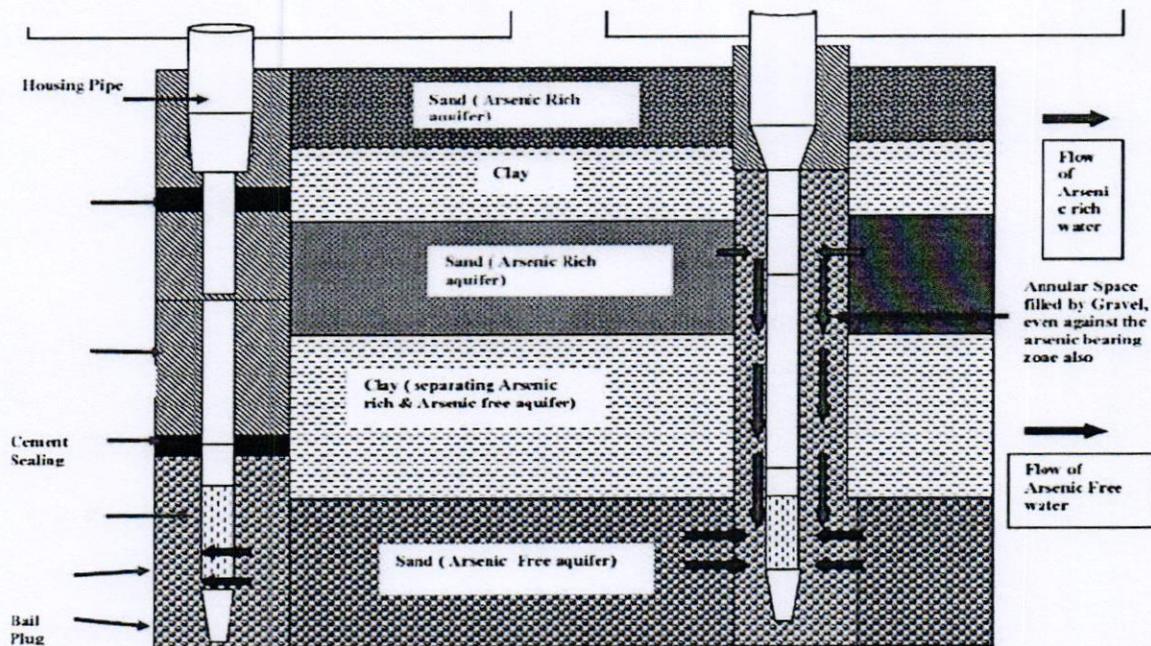


Fig.1: Tube-well design of a deep tube tapping arsenic safe deeper aquifer (the well on the left shows a properly designed tube well tapping deeper aquifer while the one on the right shows an improperly designed well).

So far, 522 exploratory wells tapping arsenic safe aquifers have been constructed under NAQUIM programme including 40 in Bihar, 188 in West Bengal and 294 in Uttar Pradesh with this technique. The innovative cement sealing technique of CGWB has been shared with the state agencies to construct arsenic free wells